

No. 877,942.

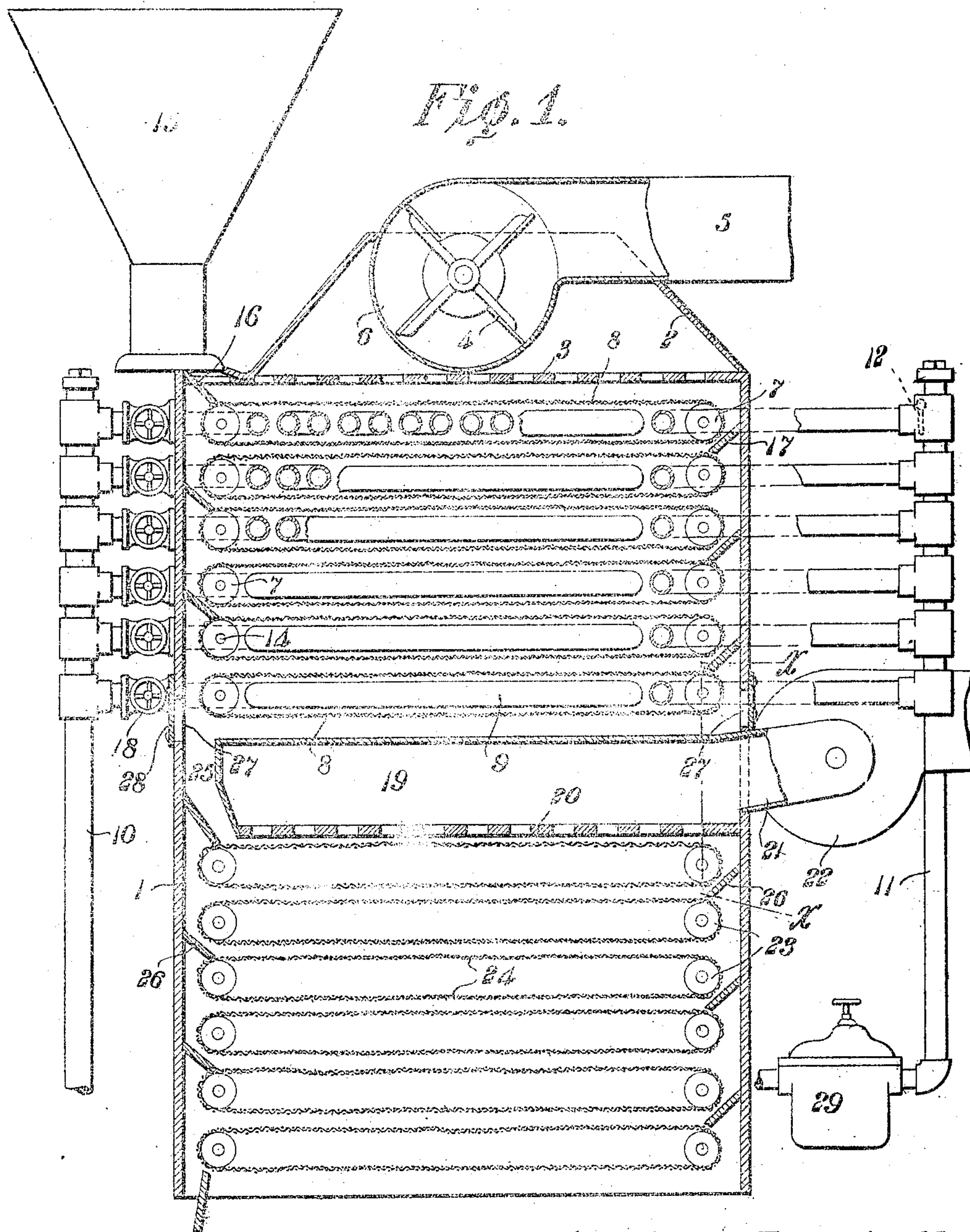
PATENTED FEB. 4, 1908.

S. J. McCARTHY.

GRAIN DRYING AND COOLING MACHINE.

APPLICATION FILED MAY 17, 1907.

2 SHEETS—SHEET 1.



*Stephen J. McCarthy,*  
INVENTOR.

WITNESSES:

*E. H. Stewart*  
*Hubert D. Lawrence*

By

*C. A. Snow & Co.*  
ATTORNEYS

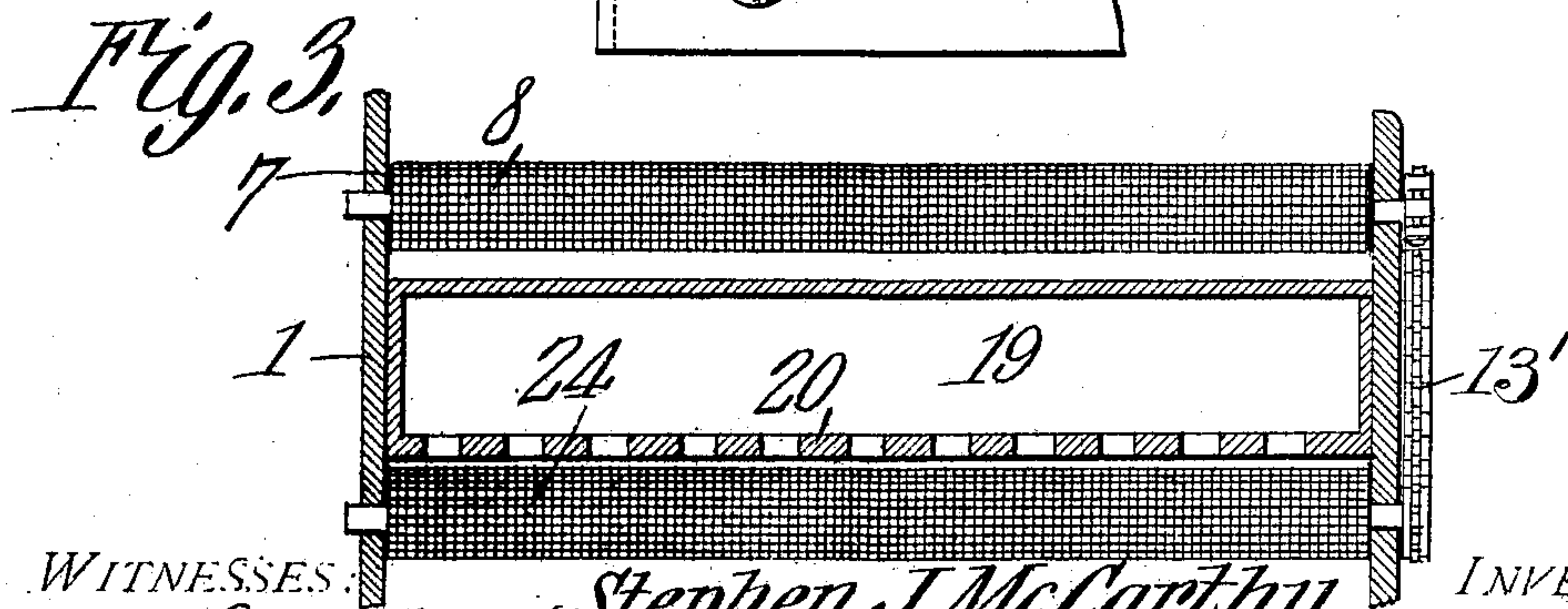
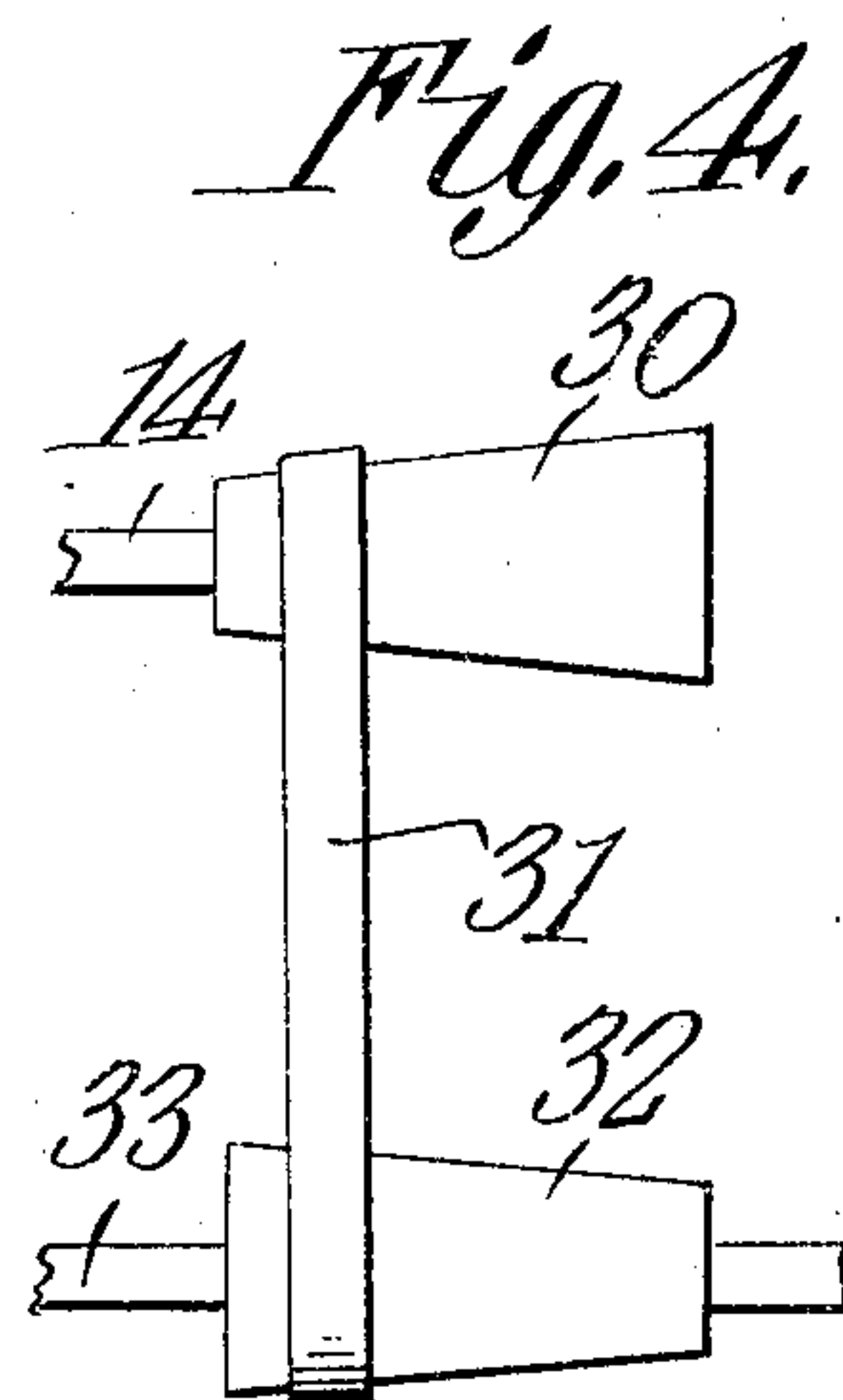
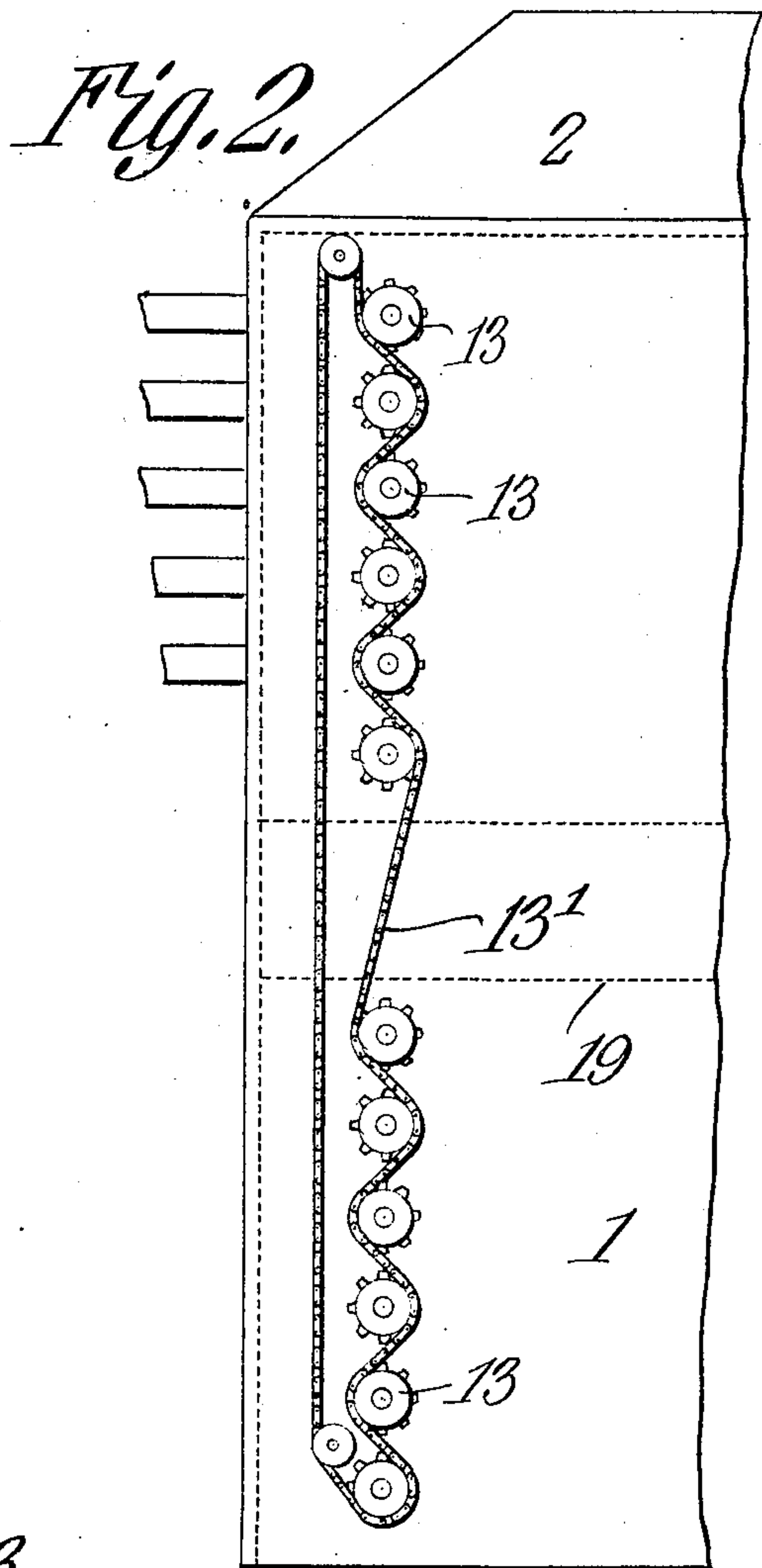
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WITNESSES:

*E. J. Blount*  
*Herbert D. Lawrence*

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ATTORNEYS

INVENTOR.



# UNITED STATES PATENT OFFICE.

STEPHEN J. McCARTHY, OF GALVESTON, TEXAS.

GRAIN DRYING AND COOLING MACHINE.

No. 877,942.

Specification of Letters Patent.

Patented Feb. 4, 1908.

Application filed May 17, 1907. Serial No. 374,198.

*To all whom it may concern:*

Be it known that I, STEPHEN J. McCARTHY, a citizen of the United States, residing at Galveston, in the county of Galveston and State of Texas, have invented a new and useful Grain Drying and Cooling Machine, of which the following is a specification.

This invention relates to apparatus for drying and cooling grain prior to sacking or binning it.

The object of the invention is to thoroughly and efficiently heat and cool grain within one apparatus, the speed of the grain through the apparatus and the degree of heat to which it is subjected being under the control of the operator.

With these and other objects in view the invention consists of certain novel features of construction and combinations of parts which will be hereinafter more fully described and pointed out in the claims.

In the accompanying drawings is shown the preferred form of the invention.

In said drawing: Figure 1 is a vertical section through the apparatus; Fig. 2 is an elevation of a portion of the machine and showing the means for transmitting motion to the aprons; Fig. 3 is a section on line  $x-x$ , Fig. 1; and Fig. 4 is a detail view showing the means for regulating the speed of the apron.

Referring to the figures by character of reference, 1 is a casing of any suitable proportions having a hood 2 at the top thereof divided from the interior of the casing by an apertured partition 3. Disposed within this hood is an exhaust fan 4 adapted to direct air through the partition 3 and discharge it through the flue 5 extending from the fan casing 6. Superposed pairs of rollers 7 are mounted within the casing, said rollers being located adjacent opposite ends of the casing, and each pair carrying an apron 8 made of wire fabric of a fine mesh. A pipe coil 9 is surrounded by each apron 8 and communicates at one end with a steam supply pipe 10, while its other end is connected with a return pipe 11, there being a check valve 12, shown by dotted lines, to prevent return movement of the exhausted steam. The aprons 8 move in opposite directions alternately and motion is adapted to be transmitted from one apron to the other preferably by means of sprockets 13 which are secured to one end of the shafts 14 of the rollers 7 and are driven by a chain 13'. Ob-

viously by increasing or diminishing the speed of these gears the time required for grain to pass through the apparatus can be correspondingly diminished or increased. A hopper 15 is disposed above the casing at one end thereof and arranged under the outlet of this hopper is an inclined board 16 which serves to direct material from the hopper outlet on to one end of the first apron 8. An inclined board 17 is disposed under the opposite end of the first apron for the purpose of directing grain therefrom on to the next apron thereunder and this arrangement of inclined boards is followed throughout the series of aprons, one inclined board being disposed under the discharge portion of each apron. A valve 18 is disposed at the inlet end of each coil 9 so that steam can be directed into any number of coils 9 at the same time.

Disposed below the lowest coil 9 and the apron surrounding it is a hood 19 the interior of which is separated from the interior of the lower portion of the casing by means of an apertured partition 20. An outlet pipe 21 extends from this hood to an exhaust fan 22. Superposed pairs of rollers 23 are arranged within the casing below the hood 19 and each pair of rollers carries a wire apron 24 preferably of a fine mesh, said aprons extending from end to end of the casing. A passage is located under the discharge portion of the lowest apron 8 and is adapted to direct grain from said apron on to the upper apron 24, and inclined boards 26 are disposed below the discharge portion of each apron 24 for directing grain therefrom on to the apron next below it. The casing is of course to be supported upon any suitable structure so that air is free to pass into the lower end thereof and a desired number of apertures 27 are formed in the walls of the casing above the hood 19 so as to permit air to enter the upper portion of the casing. These apertures are provided with closures 28 whereby the supply of air to the interior of the casing may be controlled. The return pipe 11 preferably communicates with a steam trap 29.

In using this apparatus for drying grain steam is directed into one or more of the coils 9 by opening the proper valves 18. Air entering the casing through openings 27 will be heated to a high temperature by coming into contact with the coils 9 and as the aprons are made of wire fabric the heated air will pass directly through them



while being sucked upward by the fan 4. Cold air will be sucked through the lower portion of the casing and through the fabric aprons 24 by the fan 22. After the aprons have been set in motion the grain to be dried is placed within hopper 15 and discharged therefrom on to the upper apron 8 which carries it across the path of the hot air sucked upward by the fan 4. After the grain has traveled the full length of the casing it is deposited on to the inclined board 17 and taken in an opposite direction on the next apron 8. This will of course necessitate it again passing through the ascending current of hot air and this travel of the grain will continue from apron to apron until it is discharged into the passage 25. By this time the grain is thoroughly heated and all moisture driven therefrom. It then becomes necessary to cool it so as to put it in condition to be sacked or binned. This result is accomplished upon the lower aprons 24. The grain upon being discharged from the passage 25 is directed on to the upper apron 24 and passes through the ascending current of cool air, and this operation is continued as the grain moves backward and forward on the successive aprons 24 and is finally discharged at the lower end of the casing. It will be seen that the apparatus is at all times under the full control of the operator, who, by means of the valves 18, can raise or lower the temperature of the air passing upward through the casing and can, by means of the closures 28, regulate the quantity of air passing through the coils 9. It will be seen that the apparatus is very simple in construction and will effectually prepare damp grain for sacking or storing.

As shown in Fig. 2 the chain 13' preferably presses over a couple of idlers so that the same can be maintained in proper position to rotate the sprockets in the directions desired. The speed of rotation of the sprockets can be regulated by placing a cone

30 upon the shaft 14 of one of the rollers 7 and by driving said cone by means of a belt 31 mounted on a reversely arranged cone 32 connected to a drive shaft 33. By shifting the belt longitudinally of the cone the speed of rotation of the shaft 14 can be increased or diminished as desired.

What is claimed is:

1. In an apparatus of the character described the combination with a casing; of upper and lower hoods opening downward into the casing and extending substantially throughout the transverse area thereof, heating coils interposed between the hoods, a series of aprons interposed between the hoods and movable around the coils, a second series of aprons located below the lower hood, the adjoining aprons of each series being movable in opposite directions respectively, all of said aprons being formed of an open mesh fabric, and separate means for establishing a current of air upward into the respective hoods to successively heat and cool material carried by the aprons.

2. In an apparatus of the character described the combination with a casing, and upper and lower hoods opening downward into the casing, there being an air passage past the lower hood; of a series of endless aprons interposed between the hoods, a second series of endless aprons below the lower hood, heating coils interposed between the hoods, means for establishing a current of air upward into the lower hood, and means for establishing a current of air upward from the air passage into contact with the coils and into the upper hood, the adjoining aprons of each series being movable in opposite directions respectively.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

STEPHEN J. McCARTHY.

Witnesses:

C. S. CLOUGH,

JOHN S. WHEELER.